

computation of the number of years necessary to reach a mean value for temperature within the limits of the probable error of the mean value for a single year, based upon some tables published in 1902 for the extrapolation of mean values. He was always more concerned to present meteorological data in a form amenable to computation than to increase their volume or detail. When the weekly weather report was initiated in 1884, he provided formulæ for computing the true daily mean from the maximum and minimum temperatures for the day, and for computing the amount of effective and ineffective warmth as referred to a base temperature of 42° F., which are still in use. He once astonished me by pleading for graphical representation as being easier to read than columns of figures, for he could extract the meaning of a page of figures with a facility that made the discussion of results with him an indispensable part of any piece of work that was in hand. Yet he was more than eighty years of age when we had to transact this kind of business together. He never lost his appreciation of new methods which were sound, or of new projects which were promising. Throughout his administration of the office he held to a high scientific ideal while maintaining the efficiency of such daily work as was required for public use and for international cooperation. His scientific horizon was a wide one. With Stokes and Balfour Stewart, he was largely instrumental in providing means for the organised study of the sun, which had been commenced in this country and in India by Sir Norman Lockyer, in order to trace the primary causes of those great meteorological fluctuations which exhibit themselves in alternations of drought and plenty in India, a study which, pursued for many years at the Solar Physics Observatory at South Kensington and at Kodaikanal, in India, has recently taken its place among the greater international organisations. As head of the Public Works Department in India, he transferred meteorological work in that dependency from a provincial to an Imperial basis under Blanford and Eliot, and laid the foundation for the admirable organisation of which the Government of India and its scientific staff now enjoy the advantage. At the same time, he initiated the forestry department and the application of botanical science to the service of the public in that department.

Probably no single person had clearer views of the future that lies before meteorological work as a matter of practical influence upon everyday life, or was more fully conscious of the long years of observation, organisation and study that are necessary to secure the advantages which will ultimately more than reward the long years of patient inquiry.

Above the mantelshef of the unpretentious room over a piano shop in Victoria Street, which for more than forty years has been the chief centre of meteorological work in this country, there is a clear-cut profile of an old but by no means aged man, giving an unmistakable presentment of intellectual strength altogether undisturbed by side-issues and petty difficulties. Such indeed was Strachey. Beneath the portrait over his characteristic signature are the last words of a letter written about an office balance sheet that I thought more than usually depressing. "On the whole there is nothing to complain of." For meteorologists this is, at times, a hard saying; but to me at least it is entirely characteristic of the spirit with which he insisted upon meeting the difficulties that confronted us. "A heart that is established and will not shrink," a keen appreciation of the practical services which science can render in the present and in the future, a simple determination to regard

the whole, to make the most of the means at his disposal without grumbling—these are the abiding recollections of the ten years of our association at the close of a long life devoted, with untiring energy, to the service of his country.

W. N. SHAW.

#### NOTES.

DR. C. CHREE, F.R.S., has been elected president of the Physical Society of London for the ensuing year.

THE annual congress organised by the Prehistoric Society of France will be held this year at Chambéry from August 24 to August 30.

M. BOUQUET DE LA GRYE has been elected president of the Bureau des Longitudes for 1908, M. Poincaré vice-president, and M. Bigourdan secretary.

PROF. W. J. SOLLAS, F.R.S., was elected president of the Geological Society of London at the anniversary meeting on February 21.

THE director of the Royal Meteorological Observatory at Agram, Hungary, informs us that the founder and former director, Prof. Ivan Stožir, died on February 12 after a short illness.

DR. H. F. OSBORN, one of the vice-presidents of the American Museum of Natural History and curator of vertebrate palæontology, has been elected president of the museum in succession to the late Mr. Morris K. Jesup.

It is reported from Berlin that Mr. Andrew Carnegie has given half a million marks (25,000l.) to the Robert Koch fund for the campaign against tuberculosis. The amount collected so far for carrying out research work in connection with the disease amounts to 800,000 marks (40,000l.).

AN exhibition and sale of farm and garden produce, organised by the Women's Agricultural and Horticultural International Union, will be held in the gardens of the Royal Botanic Society, Regent's Park, N.W., on Wednesday, July 15. All communications should be addressed to the secretary, Miss Eileen Johnson, c/o Mrs. T. Chamberlain, 5 Priory Mansions, Drayton Gardens, S.W.

THE American Society of Naturalists has made arrangements to celebrate the one hundredth anniversary of Charles Darwin, in cooperation with the American Association for the Advancement of Science, on the occasion of their meetings in Baltimore in 1908. The Society of Naturalists, we learn from *Science*, will be represented on the committee of arrangements by the president, the secretary, and several members.

ON Thursday next, March 5, Sir John Rhys will begin a course of two lectures at the Royal Institution on "Early British History and Epigraphy," and on March 7 Prof. J. J. Thomson will commence a course of six lectures on "Electric Discharges through Gases." The Friday evening discourse on March 6 will be delivered by Prof. John Milne on "Recent Earthquakes," and on March 13 by Chevalier G. Marconi on "Transatlantic Wireless Telegraphy."

REPLYING to a question in the House of Commons on Tuesday, Mr. Churchill said:—"It is impossible to obtain accurate statistics regarding the mortality from sleeping sickness in Uganda, but, in a recent despatch, the Governor has estimated the number of deaths at 200,000 during the past seven years. Every effort is being made by the

Government to combat the disease by scientific investigation under the direction of the Royal Society, by local administrative measures, and by international cooperation with the other Powers whose possessions in Africa are similarly afflicted."

THE council of the Royal Society of Arts has awarded the gold medal offered by the society, under the Shaw trust for industrial hygiene, to Prof. W. Galloway, "in recognition of his valuable researches into the action of coal dust in colliery explosions, the outcome of which researches has been the provision of means by which the risk of such accidents is materially diminished, and a consequent great saving of human life effected."

IN connection with the International Congress on Tuberculosis, which will be held in Washington on September 21 to October 12, a prize of 300l. is offered for the best treatise that may be submitted to the congress on the relation of atmospheric air to tuberculosis. The prize is offered by the Smithsonian Institution out of the Hodgkins fund. The treatises may be written in English, French, German, Spanish, or Italian. They will be examined, and the prize awarded, by a committee appointed by the secretary of the Smithsonian Institution in conjunction with the officers of the International Congress on Tuberculosis.

WE learn from the Berlin correspondent of the *Times* that on February 20 the Reichstag passed the second reading of the Bill for the regulation of wireless telegraphy, in accordance with the decisions of the International Congress in Berlin in 1906, and conferring a monopoly of wireless telegraphy upon the Government. The German Government desires to maintain an attitude of neutrality towards all systems of wireless telegraphy, and in particular to secure intercommunication on the part of ships and land stations without regard to the system employed. Germany has accordingly declined to bind herself to any one system, upon the ground that the efficiency of the system adopted is of far greater importance than its technical character. The special committee of the Reichstag to which the Bill was referred was informed that messages by the Marconi system would be accepted by German ships and stations if the company conformed to the obligation to exchange communications with other systems.

LAST year some opposition was shown in the American Congress to the usual vote of funds to the Biological Survey, certain members of the committee on agriculture suggesting that this branch of the agricultural department was more ornamental than useful. Accordingly, a paragraph was inserted in the Appropriation Bill directing the Secretary of Agriculture to investigate the work of the survey, and particularly to inquire into the value of the work done by the Government ornithologists. A report of this investigation has now been issued, and a whole column of the New York *Evening Post* is occupied by a summary of the services which Secretary Wilson finds that the Biological Survey has rendered to American farmers and horticulturists. Not only has this bureau issued valuable bulletins and other publications, but it has prepared the way for important legislation for protecting useful birds and for preventing the importation of such as would be injurious. A typical example is the success of the bureau in preventing the importation of the kohlmeise, the introduction of which was advocated through misapprehension in the apple-growing districts of the Pacific Coast and the North-West, where it might have done enormous damage.

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Two striking examples of the best style of modern taxidermic art are displayed in the central hall of the natural history branch of the British Museum in the shape of a male and female Californian sea-elephant from Guadalupe Island. The specimens are the gift of the Hon. Walter Rothschild, and probably represent some of the last survivors of their species. They have been mounted by Rowland Ward, of Piccadilly, in whose establishment may now be seen a walrus set up for the Edinburgh Museum, which is likewise practically a revelation in the matter of mounting as compared with the bloated mummies by which the species has hitherto been represented in our exhibition galleries.

A DISCOVERY of exceptional interest is announced in vol. vi., part iii., of *Annotationes Zoologicae Japonenses* (December, 1907), namely, the occurrence of a fresh-water medusa, referred to the genus *Limnocoedium*, in the Yang-tsi-kiang about 1000 nautical miles from its mouth. *Limnocoedium*, it will be remembered, has hitherto been known solely by *L. sowerbyi*, discovered in 1880 in the Victoria water-lily tanks at the London Botanical Gardens, and subsequently observed in similar tanks at Lyons, but never yet found in its native home. According to its describer, Dr. Asajiro Oka, the new Chinese species, for which the name *L. kawaii* is proposed, differs from *L. sowerbyi* in certain points, which are, however, insufficient to admit of its generic separation, although rendering necessary some slight modifications in the definition of the genus. The home of the typical species is generally supposed to be Amazonia (not the West Indies, as Dr. Oka states), and it is hence possible that the genus may have a distribution analogous to that of tapirs, alligators, or spoonbill-sturgeons. It may, however, be found that *Limnocoedium* is widely spread in the rivers and lakes of Asia. The Yang-tsi species was discovered in April last by Captain Kawai, of the steamboat service, near Ichang, in the province of Hupi, ten specimens having been obtained. The muddy condition of the waters of the river accounts for the medusa having previously escaped observation.

MR. JOHN BROGDEN, of 28 Colville Square, London, has sent us a copy of a catalogue of natural history specimens, in which is included biological material of almost all kinds other than skins of vertebrates. Among the specimens catalogued we notice a series of models of whales and dolphins, on a scale of 1 inch to the foot.

LANCELETS and lampreys form the subject of a paper by Mr. H. W. Fowler in the issue of the Proceedings of the Academy of Natural Sciences of Philadelphia for December, 1907. Of lampreys, the author describes, under the name of *Oceanomyzon wilsoni*, a new genus and species on the evidence of a specimen a foot in length from the Atlantic. It is regarded as connecting the true lampreys, *Petromyzon*, with the deep-water *Bathymyzon*; it may occur at some depth.

THE first part of *Sitzungsberichte Natur. Verein der preuss. Rheinlande und Westfalens* for 1907 contains an account of the scientific results of a journey recently undertaken by Dr. Borgett to East Africa and the Nyanza. Although the expedition was mainly undertaken for the purpose of studying the plankton (of which certain new forms are described), the author furnishes some interesting information with regard to the big-game fauna of the Athi Plains and Nairobi, where he is of opinion that the protective laws enforced by the British Government are working satisfactorily. Giraffe, kudu, and eland were seen

in numbers in several places, while hartebeest, gnu, water-buck, Thomson's and Grant's gazelles, and, above all, bonte-quagga, occurred in enormous herds, and rhinoceroses and hippopotamuses were by no means uncommon. The extinction, or decimation, of the fauna is, according to the author, not likely to occur for many a long day. Such testimony from an impartial and unprejudiced observer is as satisfactory as it is valuable.

For some years a difference of opinion has prevailed among palæontologists with regard to the systematic position of the group of Upper Tertiary mammals typified by the European genus *Chalicotherium*. In these mammals, it may be mentioned, the cheek-teeth are of the general type of the *Perissodactyla*, whereas the feet are of an ungulate character, the latter feature having long led to the belief that these mammals were members of the *Edentata* order. Since the date of the association of the teeth with the foot-bones (when the ungulate affinities of the group could no longer be doubted), Mr. Lydekker has persistently maintained that there is no justification for separating the chalicotherioids from the *Perissodactyla* whereas American palæontologists have with equal confidence asserted that they should form a subordinal (or ordinal) group by themselves. In an article contributed to the *American Naturalist* for December, 1907, Mr. O. A. Peterson, from the evidence of specimens referable to the genus *Moropus*, concludes "that *Moropus* is, excepting its ungulate feet, essentially a *perissodactyle* in structure. That the laterally compressed and cleft condition of the terminal phalanges is quite distinct in some of the early *Perissodactyla*, and that by adaptation . . . the unguals of *Moropus* were specially modified, and should not . . . be regarded as of ordinal importance."

M. GASTON BONNIER records in the *Comptes rendus* of the Paris Academy of Sciences (vol. cxlv., No. 27) some interesting observations on what he terms the *raisonnement collectif* of bees. In one of his experiments he placed in his garden several lumps of sugar; these were visited by bees, which, however, were unable to bite off its particles on account of the weakness of their mandibles. The bees were marked by the experimenter, and were seen to fly off to their hive; in one to two hours they returned with other workers, but this time they flew, not from the hive, but from a fountain of water. On settling on the sugar they were seen to pump water from their crops on to the sugar, and then suck up the syrup so formed, finally flying back to the hive. Other observations convinced M. Bonnier that individual bees were able to communicate news of their discoveries of fresh sources of honey to the colony, and he has reason to believe that the number of workers summoned is always proportional to the supply of honey that has been found.

THE *Bio-Chemical Journal* for January (iii., Nos. 1 and 2) contains several interesting papers, notably one by Prof. Moore and Dr. Roaf on the equilibrium between the cell and its environment in regard to soluble constituents, with special reference to the osmotic equilibrium of the red-blood corpuscles, in which the conclusion is formulated that the difference in composition of the electrolytes within and without the cell, and the physiological effects of perfusion or irrigation of cells by media defective or excessive in certain electrolytes normally present in the cell receive a simple explanation, on the basis of the formation of adsorptates or chemical combinations between cell protein (or protoplasm) and other constituents.

THERE are two essential factors with others required for the success of a nature-study course, the one that the course should be seasonal, the other that the instructor should manifest a continuous and keen interest in his subject. The first point has been effectively brought out in a pamphlet by Prof. J. A. Thomson, issued from Aberdeen University, wherein he indicates suitable lines of study for various courses. The notes refer to physical, botanical, and zoological studies. A careful perusal of the pamphlet cannot fail to supply teachers with suggestions and stimulate interest.

THE January number of *Tropical Life* contains information with reference to a rubber exhibition that is already arranged to be held at the Royal Horticultural Hall in September this year, and an International Rubber Exhibition that it is proposed to hold in London a year or two hence. In the same journal useful information with regard to methods of cultivating and curing tobacco in Porto Rico is contributed by Mr. D. W. May, and the value of manures for cacao plantations forms the subject of one of a series of articles dealing with the cultivation of cacao.

A CONTRIBUTION by Mr. F. Ramaley on the silva of Colorado, dealing with the woody plants of Boulder County, is published in vol. v., No. 1, of the University of Colorado Studies. The flora provides an interesting study in altitudinal distribution, since the elevation of the county varies from about 5000 feet to 10,000 feet at the foot of the main range, while the highest peak exceeds 14,000 feet. Grass lands rise up to 6000 feet, when open forest of rock pine, *Pinus scopulorum*, and Douglas spruce, *Pseudotsuga mucronata*, is found. A zone of lodge-pole pine, *Pinus murrayana*, mixed with rock pine and limber pine, *Pinus flexilis*, reaches to 10,000 feet, above which the Engelmann spruce is dominant. Higher again in the Alpine zone, the only woody plants are dwarf willows.

A NUMBER of the *Philippine Journal of Science* (vol. ii., No. 5), devoted to the descriptions of commercial Philippine woods, has been prepared by Mr. F. W. Foxworthy. It contains a general discussion of their structure and properties, a key for their identification, and notes on the species. The key is elucidated by means of a series of fifty-five photographs representing transverse sections. Of timbers well known on the European market, only teak and ebony are found; the former is very scarce, and the ebony is chiefly derived from *Maba buxifolia*, with less valuable timber from *Diospyros pilosanthera* and other species. "Narra" is a first-class timber yielded by *Pterocarpus indicus* and allied species, therefore related to Indian "padouk"; also the tree known in India as "poon," *Calophyllum inophyllum*, provides a timber that is employed for construction and furniture. Other valuable species are *Homalium luzoniense*, *Illipe betis*, *Pithecolobium acle*, species of *Lagerstroemia*, *Intsia* and *Vitex*, and *Pahudia rhomboidea*.

A PAMPHLET on the geology of the Roberts-Victor diamond mine has been published by Mr. J. P. Johnson (Johannesburg). This mine, which is situated in the Boshof district, Orange River Colony, presents many points of geological interest, and the author's observations lead him to believe that kimberlite, the rock in which the diamonds occur, is not an igneous rock, but a purely fragmental one, simulating in parts an igneous structure owing to changes induced by hot water or steam, and that it is to these factors that the extreme alteration of the mineral constituents of both the peridotite and pyroxenite boulders and of the matrix in which they lie is due.

A DETAILED description of the geology and mineral resources of Lawlers, Sir Samuel, and Darlot (East Murchison goldfield), Mount Ida (North Coolgardie goldfield), and a portion of the Mount Margaret goldfield is given by Mr. C. G. Gibson in Bulletin No. 28 of the Geological Survey of Western Australia. The report, which covers seventy-three pages, and is accompanied by three large folding maps and five mining plans, shows that rocks of the district comprise granites and greenstones, the payable gold quartz veins occurring in the latter. The granites are seen almost everywhere to be intrusive into the greenstones. The quartz veins appear to be of later origin than the granite, and in most cases they occur at no great distance from its junction with the basic rocks. The district under review had returned, up to the end of 1906, 581,104.61 ounces of gold.

THE Records of the Geological Survey of India (vol. xxxvi., part ii.) contain the report on the mineral production of India during 1906 compiled by Mr. T. H. Holland, F.R.S. Compared with the previous year, there was an increase of 10.9 per cent. in the value of the total production. The production included 581,545 ounces of gold, 9,783,250 tons of coal, 140,553,122 gallons of petroleum, 495,730 tons of manganese ore, and smaller quantities of salt, saltpetre, mica, ruby, sapphire, jadestone, graphite, iron ore, tin ore, chromite, diamonds, magnesite, and amber. In the same issue Mr. E. W. Vredenburg describes the ammonites of the Bagh beds, and there are several interesting brief miscellaneous notes. Amongst these there is a description of the occurrence of wavellite, which has apparently not been previously recorded from India, in the Singhbhum district, Bengal.

DR. GUSTAV BRAUN, of the Geographische Institut, University of Greifswald, announces that he is anxious to collect information as to "Bodenbewegungen," which he defines as movements taking place on restricted areas of the earth's surface as the result of gravitation (*Jahresbericht der geographischen Gesell. zu Greifswald*, 1908). He does not propose to include mountain-folding, though this might attract Herr E. Reyer and Dr. Ampferer, to name no others; but he seeks cooperation from those who have the opportunity of observing slow or sudden movements of the soil, landslides and rock-falls, flows of peat, and all kindred superficial phenomena. The results of human operations are to be included. Dr. Braun issues forms to those who can assist him, on which exact details of each case studied can be entered, and he is even willing to collect extracts from newspapers. Surely he cannot be acquainted with the reckless treatment of natural phenomena by the popular American and English Press. Yet his circulars will probably bring to his notice certain carefully studied examples of rock-creep, bog-sliding, and so forth, which will afford material for comparison with those examined by himself.

In part i. of *Aus dem Archiv der deutschen Seewarte* for 1907, Mr. A. Paulus discusses the duration of the passages of German sailing vessels in 1893-1904. This laborious investigation, which should be of practical utility as well as interesting from a general point of view, deals with the three large oceans (the outward and homeward voyages being separately discussed), and shows the average duration and the times of the longest and shortest passages in the period mentioned. The tables also give the duration of the shortest passages from about 1870, including the results obtained from a somewhat similar discussion by Dr. Schott prior to 1893, and observations from other sources. From the latter it is seen that a fair number

of the shortest voyages has occurred in the more recent period, and this result, we think, may be reasonably ascribed to the dissemination of useful information in American, English, and German charts. We note that Mr. Paulus is able to say that there are only a few German sailing vessels which do not keep a meteorological log for the Seewarte.

THE hydrographical researches carried on in connection with the international fishery investigations continue to lead to the issue of a number of useful monographs and reports. Amongst those now before us are the current issues of the *Bulletin des Résultats acquis pendant les Croisières périodique*, which has recently been enlarged in scope, with great advantage, to include observations taken during three-monthly periods, as well as those taken on the regular quarterly cruises. The number of charts and sections illustrating the results arrived at has also been increased. In *Publications de Circonstance*, No. 40, issued by the International Council, Mr. Johan Gehrke discusses the mean velocity of the Atlantic currents running north of Scotland and through the English Channel. These two currents constitute the sources of supply of Atlantic water to the North Sea. Mr. Gehrke calculates that the whole water volume that yearly passes round the north of Scotland (within certain defined limits) is about 61,000 cubic kilometres, and has a mean salinity of 35.15 ‰, whilst the annual water supply to the North Sea through Dover Straits is 2036 cubic kilometres, and its mean salinity 35.07 ‰. In *Publications de Circonstance*, No. 38, Mr. Martin Knudsen points out that in certain areas the determination of the salinity of the surface water may be of very great service to the navigator in helping him to fix the position of his vessel at sea.

A NOTE on certain Maori carved burial-chests, by Mr. T. F. Cheeseman, is published in the Transactions of the New Zealand Institute, vol. xxxix. Although it had been recorded that manoa trees, *Dacrydium colensoi*, were reserved by the Maoris for making coffins, there is little or no information regarding such coffins in which the bones were placed. The burial-chests recently discovered, and now stored in the Auckland Museum, are carved into the rough similitude of a human figure, except two of a different shape. So far as evidence is forthcoming, they may be two hundred years old.

To the January number of the Journal of the Gypsy Lore Society Mr. A. B. Sinclair contributes an article on the Oriental Gypsies. His view that there are no Indian Gypsies, that the recent find of Oriental books at Turfan, with other evidence, shows that the civilisation and phonetics we have been wont to consider special to India flourished at one time north of the Himalaya, and that therefore there is no need to seek the origin of the Romani speech in India, is startling, and not likely to be accepted without further proof than that furnished in the present article. The revived society, which has its headquarters at 6 Hope Place, Liverpool, deserves the support of all who are interested in this remarkable race.

Two papers, one by Mr. Edgar Buckingham in the Bulletin of the Bureau of Standards (U.S.A.), iii., 2, and another by Mr. J. D. Hamilton Dickson in the *Philosophical Magazine* for January, show that there is still material for discussion in the already much discussed "Joule-Kelvin" experiments on the determination of absolute temperature by the flow of gases through a porous plug. Mr. Buckingham introduces the subject with a short discussion of the fundamental equation,

which, as he points out, affords a direct comparison between the constant pressure scale of any gas and the absolute scale, but which cannot be applied directly to the constant volume temperatures without knowing the isothermal equation of the gas. He discusses the various empirical assumed formulæ for the "cooling effect," and the conclusions deducible from them. The relations of actual gas scales to the thermodynamical scale are set forth, but the author considers that the time is approaching when a mere reference of temperatures to "the gas scale" will be insufficient. Mr. Dickson's paper deals with the inversion temperature of the Joule-Kelvin effect both for small and for finite differences of pressure, with special reference to Olszewski's experiments.

THE *Physikalische Zeitschrift* for February contains a description, by Dr. C. W. Lutz, of the filament electrometer invented by himself and Dr. M. Edelmann, jun. The filament consists of a Wollaston platinum wire of about 0.001 mm. diameter suspended vertically between two narrow vertical plates, one of which can be put into electrical connection with the wire, while the other may be connected either to earth or to some source at constant potential. The repulsion of the filament from the former plate when both are charged is observed through a small microscope magnifying eighty times, and by suitably adjusting the tension of the filament the range of the instrument may be made to extend from 2 volts to 1000 volts. It is very compact, and its electrical capacity is less than 10 cm.

MR. C. W. BURROWS, of the United States Bureau of Standards, after extensive experiments on the various methods in use for demagnetising iron in magnetic testing, comes to the conclusion that the following is the best method of procedure:—the current should be reversed about twice a second, and diminished at such a rate that the decrease of induction is as nearly as possible the same each second, the process to last about ninety seconds. In obtaining the magnetisation curve of the specimen, the magnetisation current should be reversed about the same number of times, and near the end of the series two throws of the ballistic galvanometer about twenty-five reversals apart should be observed. If they agree, they may be taken as representing the normal induction. The next observation may be made by this method without its being necessary to again demagnetise the specimen (Bulletin for January).

A NEW and cheap edition (price 5s. net) of Mr. Benjamin Kidd's "Principles of Western Civilisation" has just been published by Messrs. Macmillan and Co., Ltd. The original work was reviewed at length in *NATURE* of April 24, 1902 (vol. lxxv., Supp., p. vi). In a long introduction, which appears for the first time in the new edition, Mr. Kidd replies to points raised by his critics, and refers to some differences between the evolution of the individual and of a social organism. Mr. Kidd has been appointed to deliver the Herbert Spencer lecture for 1908 before the University of Oxford in May or June next. Three lectures have already been given, namely, in 1905 by Mr. Frederic Harrison, in 1906 by Mr. Auberon Herbert, and in 1907 by Mr. Francis Galton, F.R.S.

#### OUR ASTRONOMICAL COLUMN.

SATURN'S RINGS.—The January number of the *Astrophysical Journal* (vol. xxvii., No. 1, p. 35) contains an article by Prof. Barnard in which he describes and discusses his recent observations of Saturn's rings with the 40-inch refractor of the Lick Observatory. On July 2,

1907, Prof. Barnard found that, although no direct sunlight was falling on its earthward side, the entire surface of the ring was distinctly visible. On each ansa were two prominent condensations symmetrically placed with respect to the ball. On October 4—when the earth again passed back to the shadow side of the ring—and for some days after, the ring was perfectly linear, and the condensations, which, if they were real masses on the ring system, should then have been best seen, had disappeared.

From his observations Prof. Barnard concludes that it is not merely the illuminated edge of the system which we see when the earth is on the shadow side, but the feebly luminous surface of the ring itself viewed very obliquely. The luminosity is caused by the transmittance, by repeated reflections from the particles comprising the ring, of sunlight. Adopting this interpretation, the condensations are produced by the outer brighter part of the inner ring, the higher illumination of which, as seen ordinarily by directly reflected light, or, as during these observations, by light which had by successive reflections passed through the ring, is probably due to the denser agglomeration of its particles.

THE OBJECTIVE PRISM IN SOLAR SPECTROSCOPY.—A device by which double equatorial refractors, as employed for stellar photography, may be adapted to serve as objective-prism spectroscopes in solar observations, is described by M. E. Schaer in No. 4233 of the *Astronomische Nachrichten* (p. 137, February 15). The solar rays, passing through the first objective, are, by two reflections by plane mirrors, projected along the axis of the second telescope. Before reaching the second tube the reflected image is, however, intercepted by a slit plate, so that only the narrow beam which passes through the slit traverses the tube to the object glass. On passing through the latter the light falls upon the objective prism, which is silvered on the posterior face, so that after two dispersions and one reflection it passes again through the object-glass and down the tube. The solar spectrum thus produced may be viewed with an ocular, or an arrangement for photographing it may be substituted. By the interposition of a second slit in front of the photographic plate and mechanical movements this instrument may be used as a photospectroheliograph.

UNIFORMLY DISTRIBUTED DARK SPOTS ON JUPITER.—In an article which appears in the January number of the *Bulletin de la Société astronomique de France*, Mr. Scriven Bolton describes a number of Jovian phenomena observed by him in recent years, and pays particular attention to a series of dark markings which are symmetrically distributed along the northern edge of the south equatorial and the southern edge of the north equatorial bands. As these spots occur in the same longitudes on each band and partake of a common motion, Mr. Bolton concludes that they have an objective existence. Generally, the alternate spots on the opposite bands are joined by festoons of dark material which cross the equatorial regions obliquely at angles of 45°. The spots on the southern band present the more marked uniformity, there being twenty-four of them at regular intervals throughout the whole length of this band. Drawings made on June 15, 1899, November 4, 1903, and February 23, 1907, respectively, are reproduced to illustrate Mr. Bolton's description.

DOUBLE-STAR OBSERVATIONS.—Finding that the published magnitudes of the components of double stars are generally only given approximately, Dr. Joel Stebbins, director of the Urbana Observatory, Illinois, U.S.A., decided to make a number of systematic photometric observations of them, and he now publishes the results in the *Bulletin of the University of Illinois* (vol. iv., No. 25, 1907). After describing the instruments employed and the system of observation, Dr. Stebbins gives a catalogue of the 107 double stars which he observed, and discusses the probable errors and the differences from the Harvard observations of the same objects. On comparing the results with other available observations, no evidence of variability could, with certainty, be detected, and in the case of  $\theta^1$  Orionis—the Trapezium stars—it appears certain that no change greater than 0.08 magnitude has taken place since the Harvard observations were made in 1878.